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Corrigendum

Corrigendum to "RF-plasma pretreatment of surfaces leading to TiO_2 coatings with improved optical absorption and OH-radical production" [Appl. Catal. B: Environ. 130–131 (2013) 65–72]

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Inadvertently, we have recently reported the significant production of OH-radicals generated by TiO_2 coatings on RF-plasma activated polyester when irradiated with an Osram Lumilux 827/18 W lamp [1] taking at face value the spectrum from the Osram catalogue. This spectrum is shown in Fig. 1a, with an emission starting at 400 nm and going well into the visible range [2].

Due to the unusual high production OH-radicals evaluated by the fluorescence of the hydroxy-terephthalic acid according to Ishibashi et al. [3], we decided to use a poly-methyl-methacrylate (PMMA) filter with a cut-off at 400 nm when irradiating the TiO_2 polyester samples during the *Escherichia coli* bacterial inactivation process. The fluorescence of the hydroxy-terephthalic acid used as a handle to detect the OH-radical production decreased 6th-fold as shown in Fig. 2b respect to the fluorescence shown in Fig. 2a after filtering the Osram Lumilux 827/18 W light by the poly-methyl-methacrylate (PMMA) filter with a cut-off at 400 nm. In view of these results, we asked for and obtained a more detailed emission spectrum for this lamp from Osram (Winterthur, CH). The more detailed spectrum sent to us is shown in Fig. 1b [4].

In this Erratum we present the corrected values for the fluorescence of the TiO_2–polyester samples irradiated for 30 min by an Osram Lumilux 18 W/827 lamp using a 400 nm filter in Fig. 2b. The fluorescence values are shown at times: (1) zero time (2) 10 min, (3) 20 min and (4) 30 min. The cut-off filter profile is shown in the insert in Fig. 2b. In Fig. 2b, the residual fluorescence induced by the Osram Lumilux 18 W/827 lamp filtered at 400 nm originates from the tail optical absorption of the TiO_2–polyester between 400 and 500 nm reported in Fig. 3.

The tail optical absorption may involve C-TiO_2 species with a yellow colour introduced on the polyester surface during the RF-pretreatment. These C-TiO_2 coloured species have been reported as being responsible for the optical absorption above 400 nm in Fig. 3 [5–7]. The RF-pretreatment introduces C-oxidative functionalities on the polyester and the local heat effects break the polyester inter-molecular H-bonds [8]. The water evaporation of the polyester leaves spaces for the diffusion of TiO_2 into the polyester matrix increasing with RF-plasma pretreatment time.

Fig. 4a presents the *E. coli* inactivation kinetics RF-plasma pretreated polyester samples under the Osram Lumilux lamp irradiation without a 400 nm cut-off filter. The fast bacterial inactivation kinetics observed leading to bacterial inactivation within 1 1/2 h for samples pretreated for 30 min involve a high amount of oxidative radicals (mainly OH-radicals) by the polyester-TiO_2 as recently reported [1]. Fig. 4b shows the bacterial inactivation in the presence of the cut-off filter 400 nm. The inactivation kinetics is slowed to 3 1/2 h providing further evidence for a smaller amount of highly oxidative radicals when a 400 nm cut-off filter was used during the light induced bacterial inactivation process.

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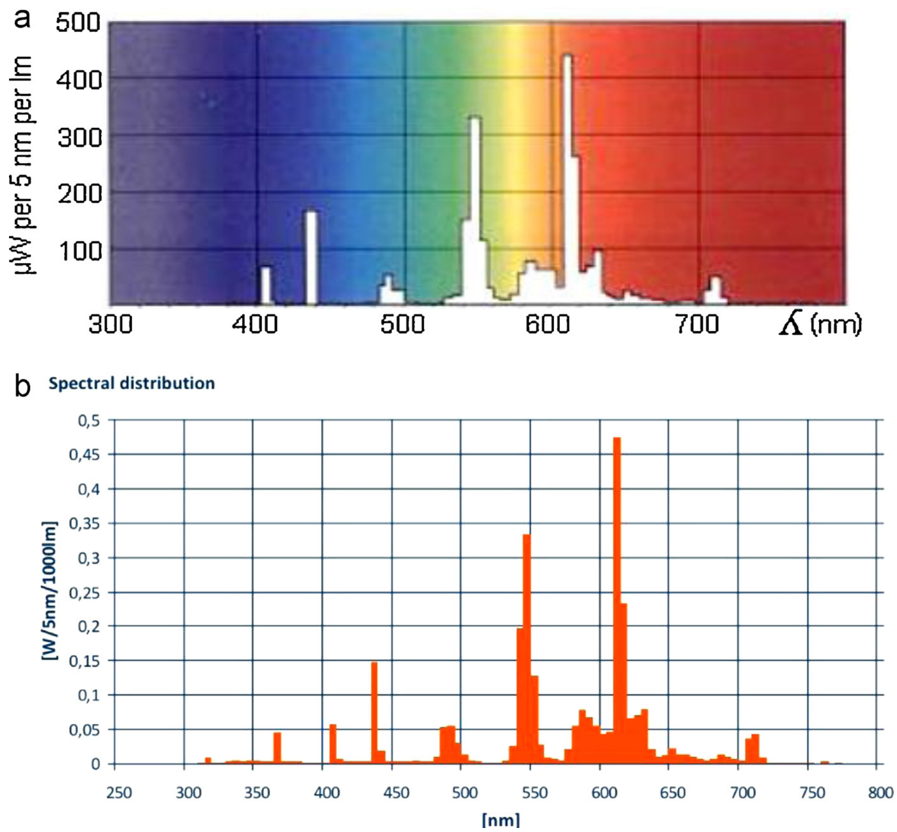

Fig. 1. (a) Spectral distribution of the Osram Lumilux 827/18 W lamp reported in the Osram catalogue (2001) and (b) spectral distribution of the Osram Lumilux 827/18 W lamp as provided May 2013 by Osram Winterthur, Switzerland.

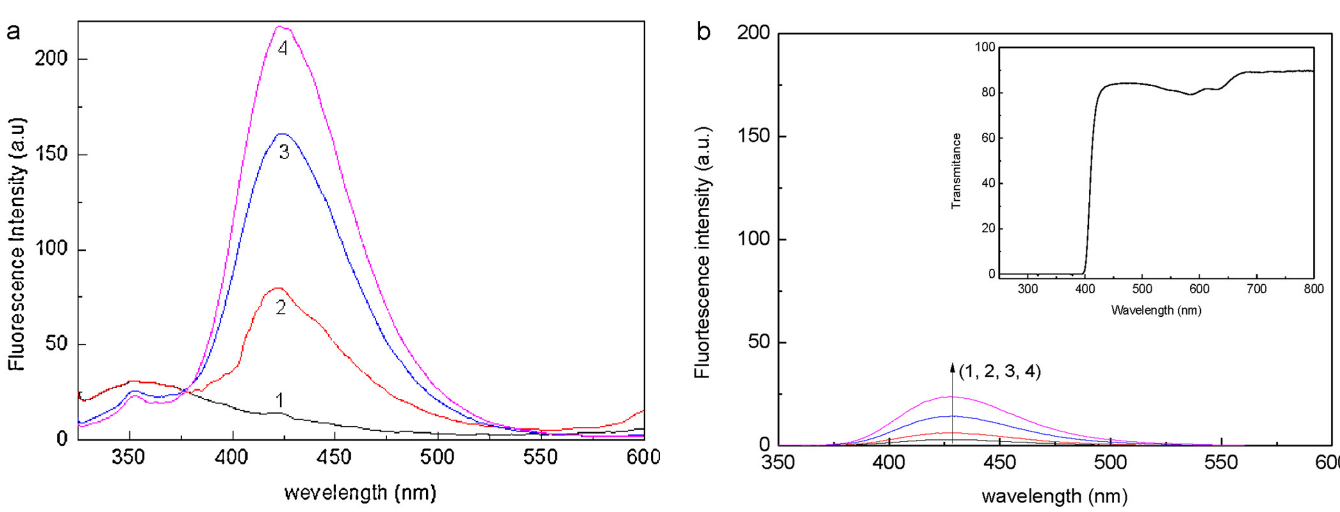

Fig. 2. (a) Fluorescence intensity *vs* wavelength for RF-TiO_2 polyester pretreated samples for: (1) zero, (2) 10, (3) 20 and (4) 30 min. Samples were irradiated for 30 min by an Osram Lumilux 18 W/827 lamp without 400 nm and (b) fluorescence intensity *vs* wavelength for RF-TiO_2 polyester pretreated for (1) zero, (2) 10 min, (3) 20 min and (4) 30 min. Samples were irradiated for 30 min by an Osram Lumilux 18 W/827 lamp using a 400 nm filter.

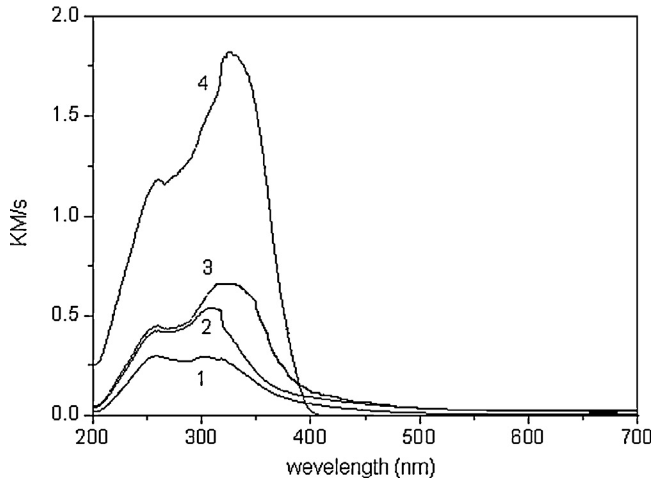

Fig. 3. Diffuse reflectance spectra (DRS) of TiO_2–polyester samples RF-plasma pretreated for (1) zero, (2) 10 min, (3) 20 min and (4)30 min.

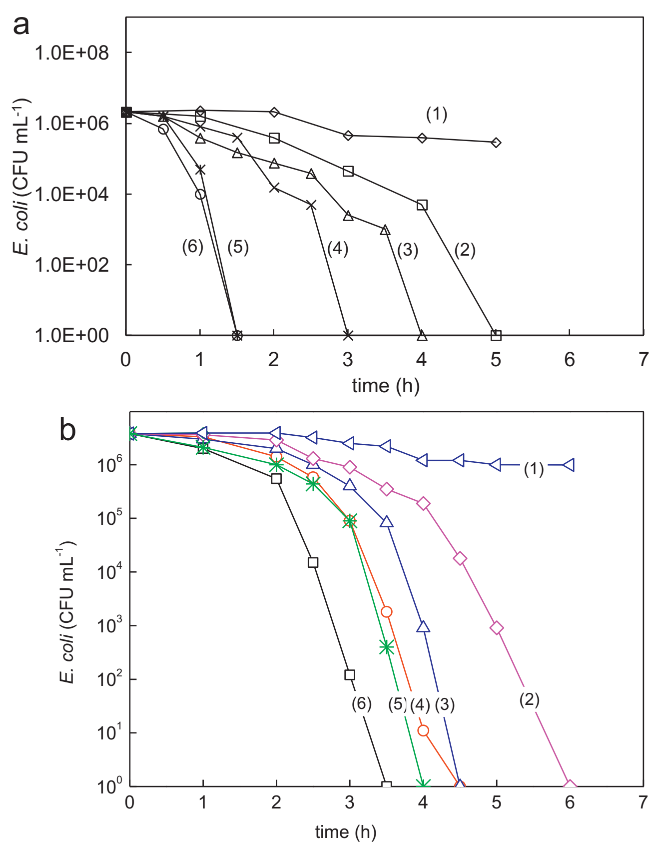

Fig. 4. (a) *E. coli* inactivation by RF-plasma pretreated samples irradiated by an Osram Lumilux 827/18 W lamp, no 400 nm cut-off filter: (1) polyester alone, (2) TiO_2 coated, polyester not RF-plasma treated, (3) RF-plasma treated samples for: 10 min, (4) 20 min, (5) 30 min and (6) 120 min and (b) *E. coli* inactivation of RF-plasma pretreated samples irradiated by an Osram Lumilux 827/18 W lamp: (1) polyester alone, (2) TiO_2 coated polyester (3) RF-plasma treated samples for 10 min, (4) 20 min, (5) 30 min and (6) 120 min. A 400 nm filter was used during these runs.

Acknowledgments

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